REMARKS

Claims 1-5, 24 and 25 are pending in the application. In the Office Action made Final at hand, those claims are rejected.

Claims 1-5 are rejected under 35 U.S.C. Section 103(a) as being upatentable over Reuter (U.S. 4,595,569) in view of Helfritch (U.S. 5,695,516). In addition, Claims 24 and 25 are rejected under Section 103(a) as being unpatentable over Reuter and Helfritch in view of Namba (U.S. 5,244,552) and Hirai (U.S. 5,015,442). In response to the Section 103(a) rejections, the Applicant respectfully submits that Claims 1-5, 24 and 25, as amended, are not obvious in view of Reuter, Helfritch, Namba and Hirai. Reconsideration is respectfully requested.

Claim 1, as amended, recites a gas conversion system for removing NO_x and SO_x from gases and includes a duct having a cross section through which the gases flow. The duct can have a port for introducing a reaction agent into the duct to the gases. First and second electron beam emitters each having a single exit window can be mounted to the duct over openings in the duct opposite from each other for directing opposed electron beams into the duct and causing components of the NO_x, SO_x and reaction agent to react to remove NO_x and SO_x from the gases. The duct can be shaped and sized, and the electron beam emitters can be configured and sized to generate electron beams that provide complete electron beam coverage across the cross section of the duct with generally evenly dispersed electrons. Claim 3, as amended, recites a treatment system, and Claim 4, as amended, recites an electron beam treatment system.

Claims 1, 3 and 4 have been amended to recite "the duct being shaped and sized, and the electron beam emitters being configured and sized to generate electron beams that provide complete electron beam coverage across the cross section of the duct with generally evenly dispersed electrons." Support for these amendments is found at least in Figs. 3 and 4, as well as on page 5, lines 3-9 and page 9, lines 8-28 of the Specification as originally filed. A typographical error is also corrected in Claims 1, 3 and 4.

In embodiments of the claimed invention, the electron beam emitters and the duct can provide complete electron beam coverage over the cross section of the duct, for example, as shown in FIGs. 3 and 4. The electron beam emitters can be sized and configured to provide electron beams having generally evenly dispersed electrons with a shape to provide complete electron beam coverage of an appropriately shaped and sized duct. In some embodiments, the

duct can have a rectangular cross section as shown in FIG. 4. In addition, in some embodiments, generally straight electron beams with generally evenly dispersed electrons, can be generated and can have a generally straight or non spreading configuration when entering the duct. Opposed generally straight electron beams can be relatively easily combined to provide complete and even electron beam coverage with evenly dispersed electrons across the cross section of a rectangular duct. As a result, a gas, compound or substance flowing through the duct can be generally evenly treated with electrons at any particular location within the cross section of the duct, thereby resulting in consistent and thorough treatment.

Reuter discloses a device for desulphurizing and denitrating flue gases having opposed electron accelerators 2 for irradiating gases flowing through a reaction canal 6. Each electron accelerator 2 has digital electron beam deflection 3 and scanning system 4. This results in an electron beam which is scanned back and forth in an outwardly angled spread or diverging formation as it enters the reaction canal 6, as seen in Fig. 2. Since the electron beam is diverging, the electrons spread out and diverge from each other moving away from the electron accelerator 2, and the effect is more noticable or pronounced near the side regions of the electron beam. Consequently, the concentration or dispersion of the electrons in the reaction canal 6 from each electron accelerator 2 can be less at the sides of the reaction canal 6. This can result in an uneven dispersion of electrons across the cross section of the reaction canal 6 with higher concentrations being at the center. An example of uneven dispersion of electrons and treatment from diverging electron accelerators can be seen in Fig. 1 of U.S. 5,015,443 (Ito), which was discussed in the Amendment filed by the Applicant on 9/24/2007. The graph of Fig. 4 of Reuter is an ionization curve for two sided irradiation, depicting the percentage of ionization for a certain amount of gas given in units g/m^2. This graph in Fig. 4 does not show the distribution of electrons across the cross section of the reaction canal 6, but rather the amount of gas ionized. Gas can be sufficiently ionized by unevenly dispersed electrons, if the power is high enough so that the power in the regions having less electrons is at a high enough level. However, this can result in less efficient operation than in the present invention since central regions can have more than the required power.

Helfritch discloses in Fig. 1 an electron beam gas scrubbing apparatus 10 which irradiates flue gases with pulsed or intermittent electron beams from electron accelerators 36 and has a

source for adding ammonia. Helfritch employes six electron accelerators positioned on one side of the reactor, and does not teach or suggest opposed emitters that provide complete electron beam coverage across the cross section of a duct.

Accordingly, Claims 1-5, as amended, are not obvious in view of Reuter and Helfritch since neither reference, alone or in combination, teaches or suggests "first and second electron beam emitters each having a single exit window mounted to the duct over openings in the duct opposite from each other," and "the duct being shaped and sized, and the electron beam emitters being configured and sized to generate electron beams that provide complete electron beam coverage across the cross section of the duct with generally evenly dispersed electrons", as recited in Claims 1, 3, and 4, as amended. Therefore Claims 1-5, as amended, are in condition for allowance. Reconsideration is respectfully requested.

Namba discloses in Fig. 1 an irradiation chamber 2 irradiated by electron beam generators 1 positioned above the irradiation chamber 2. Column 3 teaches that ozone is generated by the electron beams.

Hirai discloses in Fig. 1 a deodorizing apparatus 10 having a UV lamp 30 and an ozone decomposing catalyzing layer 34 for decomposing ozone.

Accordingly, Claims 24 and 25 are not obvious in view of Reuter, Helfritch, Namba, and Hirai, since none of the references, alone or in combination, teach or suggest "first and second electron beam emitters each having a single exit window mounted to the duct over openings in the duct opposite from each other," and "the duct being shaped and sized, and the electron beam emitters being configured and sized to generate electron beams that provide complete electron beam coverage across the cross section of the duct with generally evenly dispersed electrons", as recited in base Claim 4, as amended. Therefore, Claims 24 and 25 are in condition for allowance. Reconsideration is respectfully requested.

CONCLUSION

In view of the above amendments and remarks, it is believed that all claims are in condition for allowance, and it is respectfully requested that the application be passed to issue. If the Examiner feels that a telephone conference would expedite prosecution of this case, the Examiner is invited to call the undersigned.

Respectfully submitted,

HAMILTON, BROOK, SMITH & REYNOLDS, P.C.

By _____
Darrell L. Wong
Registration No. 36,725
Telephone: (978) 341-0036
Facsimile: (978) 341-0136

Concord, MA 01742-9133
Date: February 4, 2008